# Ahermatypic Corals from Queensland

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*Price: Three Shillings*

University of Queensland Papers
Department of Zoology
Volume II Number 6

THE UNIVERSITY OF QUEENSLAND PRESS
St. Lucia
17 April 1964

WHOLLY SET UP AND PRINTED IN AUSTRALIA BY
WATSON FERGUSON AND COMPANY, BRISBANE, QUEENSLAND
1964

# AHERMATYPIC CORALS FROM QUEENSLAND

## INTRODUCTION

While some 350 species of hermatypic or reef-building corals have been recorded from the coastal waters of Queensland, primarily from the reefs of the Great Barrier Reef (Wells, 1955, p. 21), only a few non-reef, ahermatypic, or "deep water" forms have been reported from the same region, and while in general hermatypic species certainly outnumber the ahermatypic forms in the living coral faunas, the discrepancy in the present instance is more to be attributed to the scarcity of collections from other than very shallow waters and surface reefs. Therefore any additions to the known ahermatypic fauna are important, for the east coast of Queensland extends from the Malaysian tropics in the north southward to the temperate waters off New South Wales, two extremes where the ahermatypic coral faunas are fairly well known. In the Malaysian region some 150 ahermatypic species have been described, of which about half are endemic (Vaughan & Wells, 1943, p. 88); from southeastern and southern Australia (New South Wales, Victoria, and South Australia) some 50 species are known, of which less than a third are known elsewhere. In the waters of and off the reefs of the Great Barrier Reef and southward it is to be expected that an ahermatypic assemblage intermediate between these two provinces would occur. But even

with the new occurrences reported here the data are still too few to establish the nature of the transition from the tropical to the temperate ahermatypic coral faunas.

Corals have been dredged off the New South Wales coast down to depths of nearly 500 fms, but there are almost no records of corals from depths below 50 fms along the Queensland coast, and it is almost certain that many of the deeper water forms reported from the Malaysian province to the north and the southern Australian province to the south will be found in the deeper waters off Queensland. Further dredging off Queensland is much to be desired, for it will surely bring a rich and interesting harvest of corals.

Table 1 presents the records as now known of ahermatypic scleractinian corals (including *Cycloseris* which perhaps should be classed ecologically as hermatypic) along the eastern coast of Australia from the Torres Straits south to approximately 38° S. with division into three stretches of the coast. The left hand column notes the occurrence of the reported forms in the adjacent Malaysian province. An overlap between the tropical and temperate faunas is suggested, with the tropical types dropping out as the southern end of the Great Barrier Reef system is approached and temperate types coming in almost abruptly south of the Queensland-New South Wales border.

In addition to the previously published records, the table includes the species reported on in the systematic part below, indicated by an asterisk (*), and a few additions based on specimens seen in 1954 in the collections of the Australian Museum (Sydney) and the Departments of Geology and Zoology at the University of Queensland, indicated by a circle (o). The writer expresses his thanks to the staffs of these institutions, and he is particularly indebted to Professor W. Stephenson for the recently collected material described below.

The type specimens of the new species will be deposited in the collections of the United States National Museum; all other specimens are in the collections of the Department of Zoology, University of Queensland.

TABLE 1

DISTRIBUTION OF AHERMATYPIC SCLERACTINIAN CORALS ON EAST COAST OF AUSTRALIA

*Species described in present paper

°Unpublished record

[---] Area of nearest occurrence

| | Malaysian Region | Great Barrier Reef (10° S.–24° S.) | S. Queensland Coast (24° S.–28° S.) | New South Wales Coast (28° S.–38° S.) |
|---|---|---|---|---|
| *Cycloseris patelliformis* (Boschma) | X | X | | |
| *Cycloseris sinensis* M. E. & H. | X | X | | |
| *Dendrophyllia arbuscula* van der Horst | X | X | | |
| *Dendrophyllia nigrescens* Dana | X | X | | |
| **Endopsammia philippinensis* M. E. & H. | X | X | | |
| *Flabellum rubrum* (Quoy & Gaimard) | X | X | | |
| *Heterocyathus aequicostatus* M. E. & H. | X | X | | |
| *Heteropsammia michelini* M. E. & H. | X | X | | |
| °*Paracyathus lifuensis* Gardiner | X | X | | |
| *Placotrochus candeanus* M. E. & H. | X | X | | |
| *Placotrochus laevis* M. E. & H. | X | X | | |
| *Tethocyathus minor* (Gardiner) | X | X | | |
| *Tubastrea diaphana* (Dana) | X | X | | |
| *Tubastrea micrantha* (Ehrenberg) | X | X | | |
| **Cycloseris cyclolites* (Lamarck) | X | X | X | |

TABLE 1—*Continued*

| | Malaysian Region | Great Barrier Reef (10° S.–24° S.) | S. Queensland Coast (24° S.–28° S.) | New South Wales Coast (28° S.–38° S.) | |
|---|---|---|---|---|---|
| *Culicia tenella* Dana | X | X | X | X | |
| *Tubastrea aurea* (Quoy & Gaimard) | X | X | | X | |
| **Balanophyllia affinis* (Semper) | X | | X | | |
| **Dendrophyllia fistula* (Alcock) | X | | X | | |
| **Trochocyathus virgatus* Alcock | X | | X | | |
| **Flabellum pavoninum* Lesson | X | | X | X | |
| *Balanophyllia bairdiana* M. E. & H. | X | | | X | |
| *Desmophyllum cristagalli* M. E. & H. | X | | | X | |
| *Stephanocyathus nobilis* (Moseley) | X | | | X | |
| *Balanophyllia incisa* Crossland | | X | | | |
| *Balanophyllia yongei* Crossland | | X | | | |
| ° *Caryophyllia* sp. | | X | | | |
| *Dendrophyllia velata* Crossland | | X | | | |
| *Flabellum spinosum* M. E. & H. | | X | | | [China] |
| *Flabellum vacuum* Crossland | | X | | | |
| *Heterocyathus cylicioides* (Tenison-Woods) | | X | | | |
| *Holcotrochus scriptus* Dennant | | X | | | [S. Australia] |
| *Madrepora kauaiensis* Vaughan | | X | | | [Hawaii] |
| *Oryzotrochus stephensoni* Wells | | X | | | |
| *Placotrochus pedicellatus* Tenison-Woods | | X | | | |
| **Conocyathus zelandiae* Duncan | | X | X | X | |
| *Astrangia woodsi* Wells | | | X | | |
| **Cyathoceras woodsi* n. sp. | | | X | | |
| **Dendrophyllia praecipua* (Gardiner & Waugh) | | | X | | [Zanzibar] |
| ° *Dendrophyllia* sp. cf. *D. robusta* Bourne | | | X | | |
| *Flabellum mortensi* Studer | | | X | | |
| **Heteropsammia moretonensis* n. sp. | | | X | | |
| **Leptopsammia queenslandiae* n. sp. | | | X | | |
| **Paracyathus conceptus* Gardiner & Waugh | | | X | | [Maldives] |
| *Culicia verreauxi* M. E. & H. | | | X | X | |
| *Balanophyllia buccina* Tenison-Woods | | | | X | |
| *Balanophyllia elliptica* Tenison-Woods | | | | X | |
| *Ceratotrochus inornatus* (Tenison-Woods) | | | | X | |
| *Dunocyathus parasiticus* Tenison-Woods | | | | X | |
| *Endopachys australiae* Tenison-Woods | | | | X | |
| *Flabellum irregulare* Tenison-Woods | | | | X | |
| *Notophyllia etheridgei* Hoffmeister | | | | X | |
| *Notophyllia variolaris* (Tenison-Woods) | | | | X | |
| *Platytrochus compressus* (Tenison-Woods) | | | | X | |
| *Platytrochus victoriae* (Tenison-Woods) | | | | X | |
| *Sphenotrochus excavatus* Tenison-Woods | | | | X | |
| *Trematotrochus hedleyi* Dennant | | | | X | |
| *Trochocyathus petterdi* Dennant | | | | X | |
| *Trochocyathus victoriae* Duncan | | | | X | |
| *Cyathoceras cornu* Moseley | | | | X | [S. Australia] |
| *Leptopenus discus* Moseley | | | | X | [S. Australia] |
| *Notophyllia recta* Dennant | | | | X | [S. Australia] |
| *Solenosmilia variabilis* Duncan | | | | X | [Indian O.] |

## SYSTEMATIC DESCRIPTIONS

### Class ANTHOZOA Ehrenberg 1834

### Order SCLERACTINIA Bourne 1900

### Suborder FUNGIINA Verrill 1865

Family FUNGIIDAE Dana 1846

Genus *Cycloseris* Milne Edwards and Haime 1849

The most southerly occurrence of this genus in eastern Australia appears to be in Moreton Bay, where it is represented by

*Cycloseris cyclolites* (Lamarck) 1816

Plate 1, figures 1, 2, 3

*Fungia cyclolites* Saville-Kent 1893, *Great Barrier Reef of Australia*, p. 176, chromo pl. 6, fig. 16. London: W. H. Allen.
——— ——— Doederlein 1902, *Senckenb. Naturf. Ges., Abh.* **27**, 77, pl. 4, figs. 7–9; pl. 5, figs. 5, 5a (Synonymy.)
——— ——— Boschma 1925, *Dansk Naturh. Foren., Vidensk. Medd.*, **79**, 205, pl. 5, fig. 24; pl. 6, figs. 25–48.
——— ——— Yabe and Sugiyama 1941, *Sci. Repts Tôhoku Univ.* (2), Spec. **2**, 76, pl. 54, figs. 2–4c, 8-9d; pl. 55, figs. 1–3a.
——— ——— Crossland 1952, *Brit. Mus. Nat. Hist. Great Barrier Reef Exped.* 1928-29, *Sci. Repts*, **6**, 153.
*Cycloseris* ——— Wells 1955. *Pap. Dep. Geol. Univ. Qd*, n.s., **4**(10), 11.

One specimen of this species was dredged in 1954 in 6–7 fms off Shark Spit, Moreton Bay (Wells, 1955, p. 11). Eleven more were recently dredged off Peel Island, Moreton Bay, in 4 fms. All were individuals regenerated from fragments, as is common in this genus. Crossland reported specimens from several dredge hauls farther north in the Great Barrier Reef area, but unfortunately no locality data have been published on much of the work by the Great Barrier Reef Expedition.

#### *Distribution*

Queensland: Moreton Bay (27° 30′ S.), 4–7 fms; off Holbourne Island (19° 45′ S.); Magnetic Island (19° S.); Challenger Bay, Palm Islands (18° 45′ S.); Lady Elliott Island (24° 15′ S.); Hervey Bay (25° S.); Michaelmas Cay (16° 30′ S.), 10–12 fms.

Widespread from the Red Sea and east Africa eastward to the Palau Islands; northward to Japan.

### Suborder CARYOPHYLLIINA Vaughan and Wells 1943

Family CARYOPHYLLIIDAE Gray 1847

Subfamily Caryophylliinae Gray 1847

Genus *Cyathoceras* Moseley 1881

***Cyathoceras woodsi*** n. sp.

Plate 1, figures 4, 5, 6, 7

Corallum small, attached, conical to subcornute; calice slightly compressed. Exterior lustrous, lacking epitheca; costae subequal near calice, nearly obsolete and

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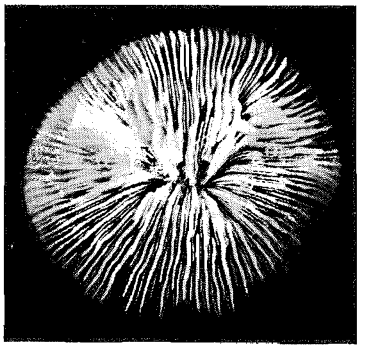
PLATE 1

*Cycloseris*, *Cyathoceras*, *Trochocyathus*, *Paracyathus*, and *Flabellum*

FIGS. 1, 2, 3.—*Cycloseris cyclolites* (Lamarck). Calicular, lateral, and basal aspects, x1. Moreton Bay.
FIGS. 4, 5.—*Cyathoceras woodsi* n. sp. Holotype: 4, lateral aspect, x2; 5, calice, x4. Off Jumpin Pin.
FIGS. 6, 7.— *Cyathoceras woodsi* n. sp. Paratype: 6, lateral aspect, x1; 7, calice, x4. Off Jumpin Pin.
FIGS. 8, 9, 10.—*Trochocyathus virgatus* Alcock. 8, lateral aspect, x1; 9, calice, x4; 10, external surface, x16. Off Jumpin Pin.
FIGS. 11, 12.—*Paracyathus conceptus* Gardiner and Waugh. 11, lateral aspect, x1; 12, calice, x2. Off Jumpin Pin.
FIGS. 13, 14.—*Flabellum pavoninum* Lesson. 13, calice, x1; 14, lateral aspect, x1. Off Southport Bar.



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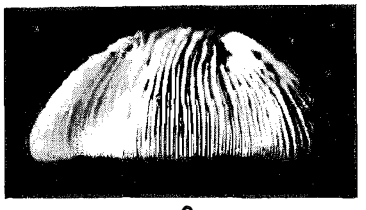

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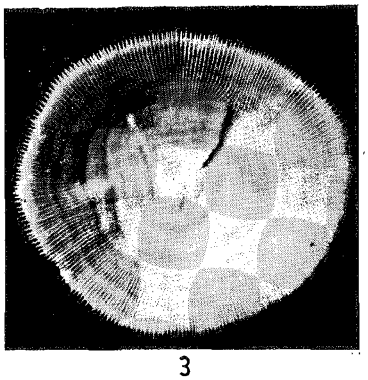

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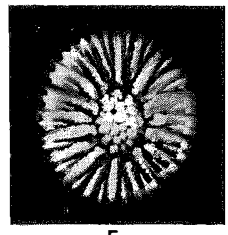

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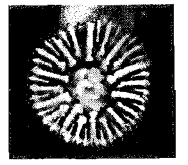

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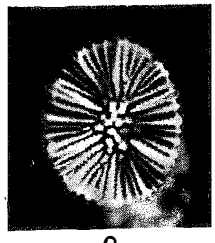

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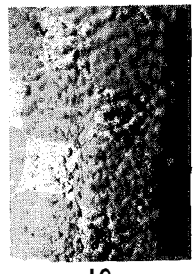

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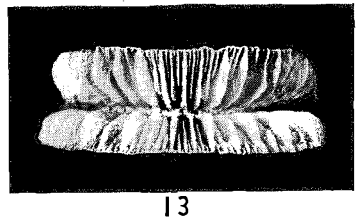

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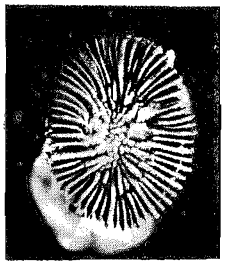

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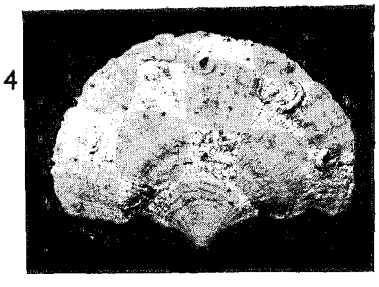

14

represented below by fine granulations. Septa slightly exsert, thin, laterally granulated, with entire margins, inwardly descending nearly vertically. Major septa (twenty), strongly crispate on inner edges. In the adult stage there are forty septa, decamerally arranged ten/ten/twenty. The first ten are equal, more exsert than the rest, reaching the columella. The second ten are less exsert, extending nearly to the columella but free internally. The last twenty septa are equal, slightly exsert, free internally, extending about halfway to the columella, their inner margins straight and lacerate. Columella well developed, composed of five to twenty crispate processes.

Dimensions:

| Specimen | Height | Calice Diameter | Septa |
|---|---|---|---|
| 1 | 6 mm | 3 x 3.5 mm | 32 (10/10/12) |
| 2 | 6.5 | 4 x 4.5 | 40 |
| 3 | 9 | 4 x 5 | 38 |
| 4 | 12 | 4 x 5 | 40 (10/10/20) |
| 5 | 11 | 4.5 x 5 | 36 |
| 6 | 13 | 5.5 x 6 | 40 (10/10/20) (Holotype) |

Colour of polyps: delicate pink.

This species groups with the type species, *C. cornu* Moseley, and the closely related *C. tydemani* Alcock, in both of which the septa are in four or more complete hexameral cycles. The main distinction is in the septal arrangement and number, normally hexameral in all the other species—*C. quaylei* Durham, *C. minoi* Yabe and Eguchi, *C. rubescens* Moseley, *C. diomedeae* Vaughan, *C. portoricensis* Vaughan, and *C. foxi* Durham and Bernard. In all of these there are at least four or more complete septal cycles, but only forty in the mature specimens of the present form.

Two immature corallites, supposed to be of this species, are adherent on the side of the holotype. Their calices are 1 mm in diameter, and in each there are two hexameral cycles (twelve) of septa, the primaries being larger than the secondaries. In the base of a paratype, inner diameter 0.75 mm, there are two hexameral cycles. In another paratype the basal portion is broken off at a diameter of 2.5 mm, exposing a more advanced stage in which there are twenty-four septa. Of these, ten larger reach the columella, with ten minor septa between, but the two second cycle septa of the system on either side of the ventral directive septum are free internally and smaller than the other second cycle septa and only slightly larger than the third cycle septa on either side of them. It would thus appear that septal development is normal and hexameral through the first three cycles of septa (twenty-four), but that, from this point on, two of the second cycle septa fail to keep pace with the rest and that fourth cycle septa are not developed in the two ventro-lateral systems—the second and third cycle septa in these two systems are the equivalent in the mature calice of the third and fourth cycle septa in the other systems.

### *Distribution*

Queensland: about 14 miles due east of Jumpin Pin (27° 45′ S.), a channel between North and South Stradbroke Islands, 47 fms.

Genus *Trochocyathus* Milne Edwards and Haime 1848

*Trochocyathus virgatus* Alcock 1902

Plate 1, figures 8, 9, 10

*Trochocyathus* (*Thecocyathus*) *virgatus* Alcock 1902. *Siboga-Exped., Mon. 16a*, 16, pl. 2, fig. 13.
——— *virgatus* von Marenzeller 1906. *Akad. Wiss. Wien., Denkschr., M.-N.Kl.*, **80**, 21, pl. 2, fig. 4.
——— (*Thecocyathus*) *virgatus* Faustino 1927. *Bureau Sci. Manila, Mon.* 22, 82, pl. 7, fig. 10.

Two specimens, small, slightly compressed coralla fixed by an expanded base, are placed in this species. The exterior is non-epithecate, with low, subequal, subrounded, finely granulated costae corresponding to all septa. Septa in four complete cycles, arranged six/six/twelve/twenty-four. Septa of the first cycle exsert about 1.5 mm, those of succeeding cycles correspondingly lower, thin, laterally finely spinulose, with nearly vertical inner margins. Spinulose pali present before all but the last cycle, but irregularly developed and not in two distinct crowns, merging with the spinulose papillae of the columella.

Dimensions:

| Specimen | Height | Calice Diameter | Septa |
|---|---|---|---|
| 1 | 12 mm | 6 x 7 mm | 6/6/12/24 |
| 2 | 13.5 | 5 x 6 | 6/6/12/24 |

Colour of polyps: column and tentacles white, disc dull orange.

### *Distribution*

Queensland: about 14 miles due east of Jumpin Pin (27° 45′ S.), 47 fms. Philippines, 15–275 m. Red Sea, 610–980 m.

Genus *Paracyathus* Milne Edwards and Haime 1848

*Paracyathus conceptus* Gardiner and Waugh 1938

Plate 1, figures 11, 12

*Paracyathus conceptus* Gardiner and Waugh 1938. *Sci. Rep. Murray Exped.* **5**(7), 184, pl. 4, figs. 8, 9.
?——— ——— Ralph and Squires 1962. *Zool. Publ. Vict. Univ. N.Z.*, No. 29, 7, pl. 2, figs. 3, 4.

One specimen, 22 mm in height, calice 10 x 14 mm and 4 mm deep, appears to be this species, originally described from the western Indian Ocean. The edges of the costae and the margins and upper sides of the septa are stained chestnut-brown. Septa exsert to 1.5 mm, relatively thin, equal at the wall, in four complete cycles (forty-eight) with ten septa of the fifth cycle present in a few systems. Pali before all but the fourth and fifth cycles. Columella of about sixteen papillae.

### *Distribution*

Queensland: about 14 miles due east of Jumpin Pin (27° 45′ S.), 47 fms. Indian Ocean: Maldives, 229 m. Red Sea, 732–805 m. New Zealand (this species?), 80–120 fms.

Subfamily Turbinoliinae Milne Edwards and Haime 1848

Genus *Conocyathus* d'Orbigny 1849

*Conocyathus zelandiae* Duncan 1876

*Conocyathus zelandiae* Duncan 1876. *Proc. Zool. Soc. Lond.* 43, pl. 38, figs. 1–3.
*Trematotrochus zelandiae* Harrison 1911. *Proc. Zool. Soc. Lond.* 1029, pl. 57, fig. 4, pl. 58, figs. 15–17, text-figs. 218b, 219.
——— ——— Folkeson 1919, *Svensk Vetens. Akad., Handl.* **59**, 14.
*Turbinolia australiensis* Gardiner 1939. *Discovery Rep.* **18**, 332, pl. 21, figs. 1, 2.

One dead specimen, 4.5 mm high, 1.5 mm diameter at the calice, with three cycles of septa and an additional cycle of twenty-four costae near the calice.

### *Distribution*

Queensland: southern end of Pearl Channel, Moreton Bay, 4.5 fms; Masthead Island, Great Barrier Reef (23° 30′ S.) (Aust. Mus.). New South Wales: Port Jackson; Watsons Bay; off Southern Reef, Sydney Heads, 10 fms; between Greycliffe and

Sharks Island, 12 fms (Aust. Mus.). Western Australia: Broome (18° S.) (worn specimens in stomach of a blowfish). Persian Gulf. New Zealand: Cook's Strait, New Zealand (Duncan, cotypes B.M.N.H. No. 90.2.27.213) (not subsequently recorded—see Ralph & Squires, 1962, p. 3).

Family FLABELLIDAE Bourne 1905

Genus *Flabellum* Lesson 1831

*Flabellum pavoninum* Lesson 1831

Plate 1, figures 13, 14

*Flabellum pavoninum* Vaughan 1907. *U.S. Nat. Mus. Bull.* **59**, 49, pls. 1, 2, 3. (Synonymy). (*typicum*, 52, pl. 52, pl. 1, figs. 2–3).
——— ——— Hoffmeister 1933. *Australia Dept Trade and Customs: Fisheries: Biol. Results Endeavour* 1908, **6** (1), 2, 5.

One specimen of the typical form of this species as limited by Vaughan.

### *Distribution*

Queensland: about 20 miles off Southport Bar (27° 58′ S.), 44–45 fms. Southeast coast of Australia, 40–200 fms. Hawaii (type). Malaysia. Japan. China Sea. Cape of Good Hope. (43–519 fms).

Suborder DENDROPHYLLIIDA Vaughan and Wells 1943

Family DENDROPHYLLIIDAE Gray 1847

Genus *Balanophyllia* Wood 1844

About thirty species of this genus have been described or reported from the Indo-Pacific. Many are based on single specimens and all are in need of revision. Only three have been recorded in Australian waters: *B. buccina* Tenison-Woods 1878 (p. 334, pl. 5, figs. 5a–d) from New South Wales (Cape Three Points and Port Stephens, 70 fms); *B. dilatata* Dennant 1904 (p. 10, pl. 1, figs. 2, 2a) from Port Phillip Bay, Victoria; and *B. bairdiana* Milne Edwards and Haime (Moseley, 1881, p. 190, pl. 12, figs. 4–7) from Bass Straits, 30–40 fms, and off Port Jackson, New South Wales. *Heteropsammia elliptica* Tenison-Woods 1878 (p. 339, pl. 6, figs. 3a–b), from Port Jackson, is not typical of *Heteropsammia* and may prove to be *Balanophyllia*.

*Balanophyllia affinis* (Semper) 1872

Plate 2, figures 1, 2, 3

*Rhodopsammia affinis* Semper 1872. *Zeitschr. Wiss. Zool.* **22**, 261, pl. 19, figs. 7a, 7b.
*Balanophyllia*———Faustino 1927. *Bureau of Sci. Manila, Mon. 22*, 228, pl. 75, figs. 1–12 (synonymy).
——— ——— van der Horst 1931. *Records Indian Mus.* **33**, 10.
——— ——— Gardiner and Waugh 1939. *Sci. Rep. Murray Exped.* **6**, 240.
——— ——— Yabe and Eguchi 1942. *Sci. Repts Tôhoku Univ.* (2), **22**, 140, pl. 12, figs. 11, 12.

Nineteen specimens from the Jumpin Pin locality. The smallest, an immature corallum, measures 2 mm in height, calice 1.5 x 2 mm, with only eighteen septa.

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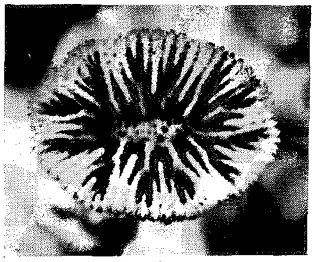
PLATE 2

*Balanophyllia*, *Dendrophyllia*, *Leptopsammia*, and *Endopsammia*

FIGS. 1, 2, 3.—*Balanophyllia affinis* (Semper). 1, 2, lateral aspects, x1, x4; 3, calice, x4. Off Jumpin Pin.
FIGS. 4, 5.—*Dendrophyllia fistula* (Alcock). 4, corallum, x1; 5, calice, x4. Off Jumpin Pin.
FIGS. 6, 7.—*Dendrophyllia praecipua* (Gardiner and Waugh). 6, portions of two colonies, x1; 7, calice, x4. Off Jumpin Pin.
FIGS. 8, 9, 10.—*Leptopsammia queenslandiae* n. sp. Holotype: 8, 9, lateral aspects, x1, x4; 10, calice, x4. Off Jumpin Pin.
FIG. 11.—*Leptopsammia queenslandiae* n. sp. Paratype: calice, x4. Off Jumpin Pin.
FIGS. 12, 13.—*Endopsammia philippinensis* M. E. & H. 12, lateral aspect, x1; 13, calice, x4. Heron Island, Great Barrier Reef.



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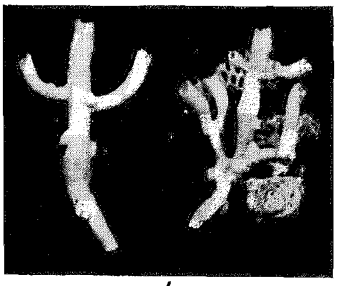

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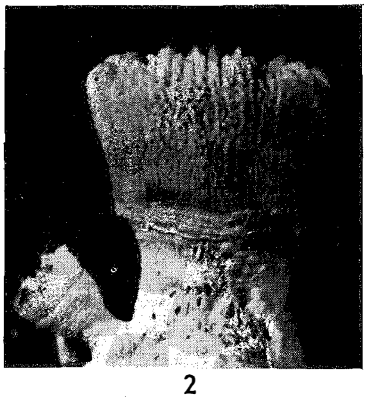

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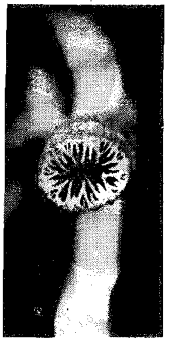

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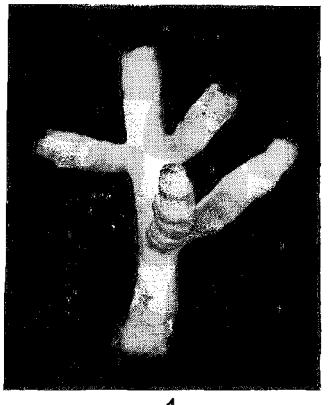

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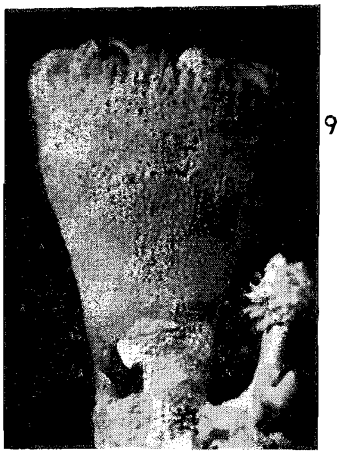

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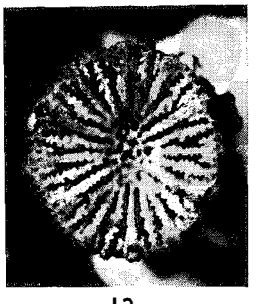

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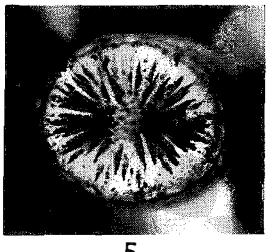

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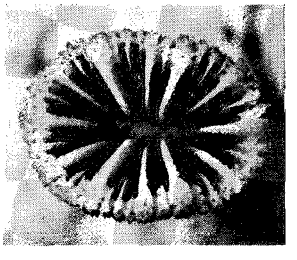

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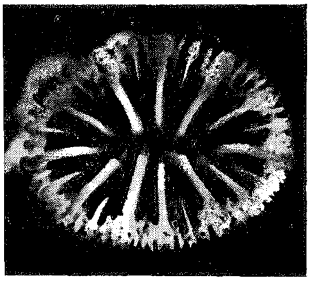


A slightly larger specimen, calice 2.5 x 3 mm, has twenty-four septa. The next larger, calice 3.5 x 4 mm, has the full complement of forty-eight septa, arranged as typical for the genus. Other specimens have calices ranging from 7 x 9 to 8 x 12 mm and have up to sixteen septa of the fifth cycle.

The corallum is conical to subcornute, slightly compressed, with oval calice, well attached by a base about 3 mm broad in mature coralla. Externally the costae are obsolete in some specimens and represented only by rows of low spines; in others, especially smaller coralla, they are distinct and equal, perforate with two rows of minute spines. A very thin, translucent, finely wrinkled epitheca extends about halfway from base to calice.

The septa are slightly exsert, those of the first two cycles equally exsert, those of the fourth cycle next, those of the second and third cycles least exsert. The columella is elongate, one-third the longer calice diameter, trabecular, with an even upper surface, varying in thickness from one-fifth to one-half its length. To it are joined the inner ends of only the twenty-four third cycle septa.

### Distribution

Queensland: about 14 miles due east of Jumpin Pin (27° 45′ S.), 47 fms. Philippines (types), 6–30 fms. East Indies, 75–245 m. Indian Ocean, 6–49 fms. Japan, 115–307 m.

Genus *Dendrophyllia* Gray 1847

*Dendrophyllia fistula* (Alcock) 1902

Plate 2, figures 4, 5

*Dendrophyllia fistula* Wells 1954. *U.S. Geol. Surv. Prof. Paper* 260-*I*, 472, pl. 180, figs. 1–3 (synonymy).

A small colony of seven corallites, completely encrusted to within 0.5–1.0 mm of the calices by a bryozoan. Largest calice: 5 x 5.5 mm, with four complete cycles of septa arranged six/six/twelve/twenty-four, all of which, except the fourth cycle, are fused to the very large, spongy columella.

Colour of polyps: column brownish-green, basally dull purple, tips of tentacles orange. Colour of specimen from Bikini Atoll: orange.

### Distribution

Queensland: about 14 miles due east of Jumpin Pin (27° 45′ S.), 47 fms. Red Sea, 183–450 fms. East Indies, 17–136 fms. Bikini Atoll, 117–121 fms. Japan, 51–265 fms.

*Dendrophyllia praecipua* (Gardiner and Waugh) 1939

Plate 2, figures 6, 7

*Balanophyllia praecipua* Gardiner and Waugh 1939. *Sci. Rep. Murray Exped.* **6**, 240, pl. 1, fig. 2.

Four fragments of small colonies. The habit is like *D. fistula* but the corallites are consistently much smaller, with a maximum diameter of 3 mm compared with about 6 mm in the colony of *D. fistula* from the same locality. Like the latter, the colonies are partly encrusted by a bryozoan over a very thin epitheca that extends to within a few mm of the calices. Costae are distinct, thin, equal, and granulated. Septa slightly exsert, in four complete cycles in the largest calice, arranged in the Pourtalès plan, porous, raggedly dentate, laterally strongly granulated. Columella small, trabecular.

Colour of polyps: column red brown–purple brown, tentacles peach colour.

### Distribution

Queensland: about 14 miles due east of Jumpin Pin (27° 45′ S.), 47 fms. Off Zanzibar, 73–165 m.

Genus *Leptopsammia* Milne Edwards and Haime 1848

Type species: *L. stokesiana* M. E. & H. 1848, Recent, Philippines (holotype: B.M.N.H. No. 55.12. 27.1).

This genus, like *Endopsammia* and *Tubastrea*, *int. al.*, is distinguished from *Balanophyllia* by the septal arrangement which is "normal" in the adult stage instead of the specialized "Pourtalès plan" of *Balanophyllia* and many other dendrophylliids. The differences between *Endopsammia* and *Leptopsammia* are apparently so slight that van der Horst (1922, p. 100) was led to include *Endopsammia* in *Leptopsammia*. The present writer created confusion when, after studying the types of the type species of both genera, he concluded that traces of the Pourtalès plan are found in early stages of *Leptopsammia* and that the genus was a *Balanophyllia* (Vaughan & Wells, 1943, p. 236; Wells, 1956, p. 433). He is now convinced that Milne Edwards and Haime were quite correct in the first place and that *Leptopsammia*, represented by Indo-Pacific (*L. stokesiana* M. E. & H., *L. conica* v. d. Horst, *L. crassa* v. d. Horst, and *L. pocula* (Alcock) ) and Mediterranean (*L. pruvosti* Lacaze-Duthiers and *L. microcardia* Doederlein) species, is distinct from both *Balanophyllia* and *Endopsammia*. Both *Endopsammia* and *Leptopsammia* are alike in the regular arrangement of the septa (except possibly in the earliest developmental stages) and different in the structure of the septa: thick, with coarse and irregularly projecting trabecular spines and dentate margins (except for the first cycle which may have nearly smooth margins) in *Endopsammia*; and thin, with fine and scarcely projecting trabecular spines arranged in rows normal to the margins, and entire or very finely, evenly dentate margins (except in higher cycles) in *Leptopsammia*. In both epitheca may be developed, the walls are relatively thin and highly porous, and the costae either well marked or obsolete.

***Leptopsammia queenslandiae*** n. sp.

Plate 2, figures 8, 9, 10, 11

Corallum turbinate to subconical, attached by an expanded base. Wall thin, highly perforate, costae obsolete, the exterior covered by fine, equal spines roughly arranged in vertical rows. Epitheca extremely thin, covering but not concealing the mural spines and extending to within a mm of the calicular margin or developed only basally. Calice oval, 4–8.5 mm deep. Septa of the first two cycles (twelve) equal, exsert, inner margins descending vertically to the columella to which they are attached. Third cycle septa (twelve) scarcely exsert, narrow, free on their inner edges and extending less than halfway to the columella, generally with complete margins but rudimentary in some systems. Fourth cycle septa (twenty-four) incomplete, free, rudimentary, not developed in all systems except in larger corallites. Fifth cycle septa (forty-eight) complete but very rudimentary in the largest corallite, with traces of a sixth cycle. Columella deep, even-surfaced, trabecular, compressed with longer axis about one-third the length of the longer calicular axis. Dissepiments absent.

Dimensions:

| Specimen | Height | Calice Diameter | Septa |
|---|---|---|---|
| 1 (holotype) | 19 mm | 8 x 10 mm | 12/12/24 |
| 2 (paratype, figured) | 13 | 6.5 x 9 | 12/12/22 |
| 3 (paratype) | 17 | 5.5 x 7 | 12/12/10 |
| 4 (paratype) | 15 | 8 x 10 | 12/12/24/48 |

Colour of polyps: column and tentacles cream, disc light fawn to light chestnut brown.

Four other Indo-Pacific species of this genus are known, as previously mentioned. All of these appear to differ from *L. queenslandiae* by their relatively distinct costae. In *L. queenslandiae* costae are distinguishable only in the earliest stages. In *L. conica* the septa of all four cycles are complete with entire margins; in *L. crassa* the septa

are not exsert, the costae are obscure but present, and the fifth cycle septa are rudimentary in a large calice (10 x 12 mm); in *L. pocula* (originally placed in *Endopsammia*) the first two cycles of septa are unequally exsert, the costae are distinct; in *L. stokesiana* the costae are faint but distinct, the septa of the first two cycles are unequally exsert, and in some systems the septa of the fourth cycle unite with those of the third.

***Distribution***

Queensland: about 14 miles due east of Jumpin Pin (27° 45′ S.), 47 fms.

Genus *Endopsammia* Milne Edwards and Haime 1848

Type species: *E. philippinensis* M. E. & H. 1848, Recent, Philippines (cotypes: B.M.N.H. No. 55.12.27.25; and Paris, Milne Edwards Coll., figured).

The type species of this genus was well illustrated by Milne Edwards and Haime. It differs from *Leptopsammia* principally by its thick, coarse, scarcely exsert septa.

*Endopsammia philippinensis* Milne Edwards and Haime 1848

Plate 2, figures 12, 13

*Endopsammia philippinensis* M. E. & H. 1848, *Ann. Sci. Nat.* (3) **10**, 91, pl. 1, figs. 5, 5a.
——— ——— ——— 1860. *Hist. Nat. Corall.* **3**, 108.
*Thecopsammia regularis* Gardiner 1899, *Willey's Zool. Results* (2), 169, pl. 19, figs. 8a–8b.
*Balanophyllia regularis* van der Horst 1926, *Trans. Linn. Soc. Lond.* (2), *Zool.* **19** (1), 50, pl. 3, figs. 10, 11.
*Endopsammia philippinensis* Faustino 1927, *Bureau of Sci. Manila, Mon. 22*, 243, pl. 77, figs. 5, 6 (from M. E. & H.)

Three specimens, from 6.5 to 10 mm in height, subcylindrical in form, with slightly oval calices 5 x 5.5 to 6.5 x 8 mm, have a well-developed epitheca extending to within 1 or 2 mm from the calice margin. In all three there are four complete cycles of septa, regularly arranged. The fourth cycle septa are very small, highly porous, non-exsert ridges. In the two larger coralla the first two cycles are equal and exsert nearly 1 mm, the third cycle slightly less exsert; in the smallest corallum the first cycle septa are most exsert, followed by the second cycle, and so on. In the two larger coralla the septa of the first three cycles are equal in thickness and all extend to the columella; in the smallest the first three cycles are nearly equally thick but the third cycle does not reach the columella and is fused to the second cycle or short and free. All septa laterally coarsely granulated by protuberant trabeculae so that the interspaces appear thinner than the septa. Columella well developed, trabecular, even-surfaced and deep in the calice.

Colour of polyps: lemon yellow.

***Distribution***

Queensland: Heron Island, Capricorn Group, Great Barrier Reef (23° S.), on underside of broad frond of *Acropora*, reef flat. Lifu, 40 fms. Philippines. Maldives. Chagos. Seychelles. Amirante, 34 fms. Zanzibar.

Genus *Heteropsammia* Milne Edwards and Haime 1848

***Heteropsammia moretonensis*** n. sp.

Plate 3, figures 1-7

Corallum solitary, free, subcuneiform, base expanded only in direction of longer plane of calicular axis, enclosing tube of commensal sipunculid. Calice compressed,

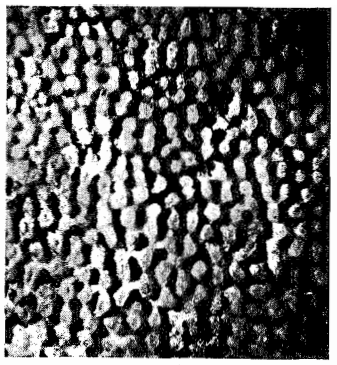
PLATE 3

*Heteropsammia* and *Stylaster*

FIGS. 1, 2, 3, 4.—*Heteropsammia moretonensis* n. sp. Holotype: 1, 2, lateral aspects, x1, x2; 3, calice, x4; 4, lateral surface of corallum, x16. Pearl Channel, Moreton Bay.

FIGS. 5, 6, 7.—*Heteropsammia moretonensis* n. sp. Paratype: 5, 6, lateral aspects, x1, x2; 7, calice, x4. Pearl Channel, Moreton Bay.

FIGS. 8, 9, 10, 11, 12.—*Stylaster incompletus* (Tenison-Woods). 8, colony, x1; 9, 10, cyclosystems, x20; 11, cyclosystems and ampullae, x16; 12, dead fragment: cyclosystems and ampullae, x16. Off Jumpin Pin.



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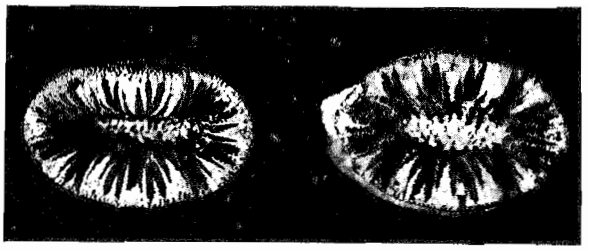

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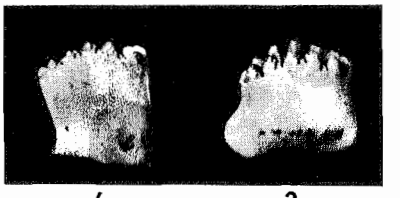

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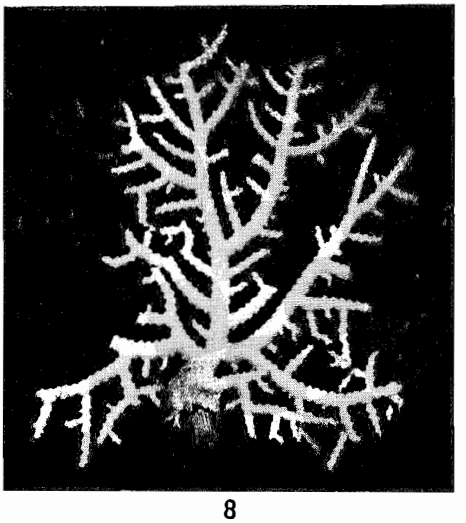

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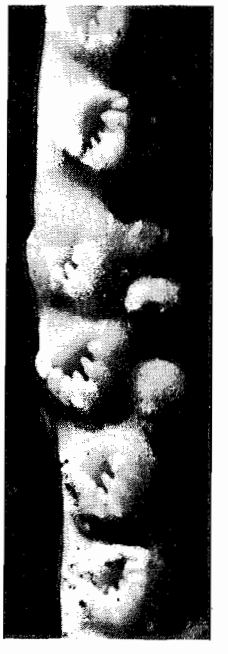

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shallower at ends of longer axis, 2 to 4 mm deep. Wall thin, porous, covered with very small round to compressed echinulations roughly arranged in vertical rows on the sides and evenly or in clusters of two or three over the base. Septa in four complete cycles (twelve/twelve/twenty-four), imperforate (except at the wall), laterally strongly spinulose, with smooth margins except the last cycle and reaching to the columella. The first two cycles are thickened at the wall and most exsert. Columella compressed trabecular, even on the surface, with longer axis about half the length of the longer calicular axis.

Dimensions:

| Specimen | Height | Calice Diameters |
|---|---|---|
| 1 (holotype) | 8 mm | 5 x 8 mm |
| 2 | 9 | 4.5 x 8 |
| 3 | 6 | 5 x 7 |
| 4 | 6.5 | 5 x 7.5 |
| 5 | 7 | 4.5 x 7.5 |
| 6 | 5.5 | 4.5 x 6.5 |
| 7 | 6 | 5 x 5.5 (octameral) |

One specimen, number 7 above, has the septa octamerally arranged: eight/eight/sixteen.

This species differs from the other recognized species of the genus: *H. cochlea* (Spengler), *H. geminata* Verrill, and *H. michelini* Milne Edwards and Haime, all of which may prove to be the same species, by its subcuneiform corallum and non-inflated base. *H. michelini* has been reported by Saville Kent (1893, pp. 106, 177, chromo pl. 6, fig. 12) from the Capricorn Islands and Cleveland Bay, Great Barrier Reef, 20 fms, and there is a single specimen of this species from a beach (Emu Park) near Rockhampton (22° 15′ S.) in the collections of the Department of Geology, University of Queensland. An undetermined species of the genus occurs with *Heterocyathus* and *Cycloseris* in a dredge haul from 12 fms off Gatcombe Head (23° 45′ S.); also in a haul from 10 fms in the Hope Islands, both in the Australian Museum, Sydney.

### *Distribution*

Queensland: 4 miles northeast of Pearl Channel buoy, in Pearl Channel, Moreton Bay (six specimens), 6 fms; and Pearl Channel, 1 mile west of Pearl Channel buoy (one specimen, octameral), 6 fms.

## Class HYDROZOA Owen 1843

### Order STYLASTERINA Hickson and England 1905

#### Family STYLASTERIDAE Gray 1847

Genus *Stylaster* Gray 1831

*Stylaster incompletus* (Tenison-Woods) 1883

Plate 3, figures 8–12

*Allopora incompleta* Tenison-Woods 1883, *Proc. Linn. Soc. N.S.W.* **7**, 207–208 (no figs.).

A number of fragments from the Jumpin Pin locality are referred to this poorly-known species, which has never been figured or redescribed. The branching is in one plane, with slender, slightly tapering twigs from 1 to 3 mm in thickness, branching at about 60°. Surface of the coenosteum appearing dense, but longitudinally very finely striate with single rows of minute pores between the ridges. Cyclosystems in

plane of branching, incomplete, maximum width 1 mm and averaging nine per cm along the branches, with a shelf-like diastema on the inner or distal side. On the smaller twigs the cyclosystems are smaller: about 0.9 mm across. Terminal cyclosystems may be complete. Margins of protuberant cyclosystems near tips of branches slightly flared. Dactylopores averaging nine in larger cyclosystems, with as few as six in small ones and as many as eleven in a few larger ones. Gastrostyle deep in the gastropore, slender, conical, bristling with fine spines. Ampullae about 0.75 mm in diameter, low, hemispherical, crowded on the planar sides of the branches, their surfaces finely porous or delicately striate as elsewhere on the coenosteum.

Colour: pink when alive; ivory white when dried.

A few species of *Stylaster* have been described in which the cyclosystems are commonly incomplete, in addition to *S. incompletus*: *S. lonchitis* Broch 1947 (p. 309, pl. 1, fig. 2, text-fig 2) from Pemba Channel, 113 m, which has cyclosystems about the same size but the ampullae are strongly protuberant with strongly granulated surfaces, and the diastema has no lip or shelf, a condition that also differentiates *S. incompletus* from the diastemate forms of *S.* "*eximius*" (*S. duchassaingi*) and *S. flabelliformis* (Lamarck).

### *Distribution*

Queensland: about 14 miles due east of Jumpin Pin (27° 45′ S.), 47 fms. New South Wales: off Port Stephens (32° 40′ S.), 30 fms (Tenison-Woods).

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